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REPORT

50X1-HUM

CD NO.

COUNTRY USSR

DATE OF
INFORMATION 1950

SUBJECT Scientific

DATE DIST. 2nd Jun 1950HOW
PUBLISHED Weekly newspaperWHERE
PUBLISHED Moscow

NO. OF PAGES 3

DATE
PUBLISHED 20 Apr 1950SUPPLEMENT TO
REPORT NO.

LANGUAGE Russian

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SOURCE Meditsinskiy Rabotnik, Vol XIII, No 16 (880), 1950.ON THE NATURE OF VIRUSES AND MICROBES

G. Bosh'yan

[A Digest.]

[With regard to the results and theory presented by Dr G. M. Bosh'yan, the editors of Meditsinskiy Rabotnik remark that a thorough review of the current concepts on the nature of filterable viruses and microbes and on the changes which microbes are capable of undergoing may become necessary in the light of the views advanced by this investigator.]

In the course of work on the virus which causes infectious anemia of horses, it could be established that this virus under certain conditions undergoes transformation into a microscopically visible microbe. Subsequently, it can be grown in artificial nutritive media, while continuously changing morphologically, biochemically, and with respect to growth of cultures, these changes depending on external conditions. It was shown experimentally that this is also true of other viruses.

On the basis of this work, the following three relationships may be formulated:

1. Filterable viruses are capable of transformation into microbe forms, which may change back into filterable viruses.
2. Microbe forms are capable of transformation into filterable forms, (viruses), which may change back into microbe forms.
3. Both filterable viruses and microbe forms are capable of transformation into crystalline forms. The latter may again be brought into the original state corresponding to the initial form.

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In connection with this work, the living nature of the following was established: vaccines, which were formerly considered to be dead (including chemical vaccines), a medico-prophylactic sera, allergens, toxins and anatoxins, bacteriophages, and antibiotics. Also, the underlying cause of immunity to infectious diseases was clarified.

When a pathogenic microbe penetrates into the body of an animal, the microbe's cell breaks down into its component parts and assumes a filterable form, i.e., the microbe becomes a virus. On breaking down, the microbes become less pathogenic or nonpathogenic and assure immunity to the animal. In other words, the microbe is transformed from an antagonistic agent into a living substance associated with the host, this process at the same time safeguarding the survival of the microbe. Contrary to accepted views, a sharp line between parasitism and saprophitism cannot be drawn: there is always mutual adaptation. The interconversion of filterable viruses and microbes is not accidental, but quite general and represents a universal biological law. The virus forms and microbe forms of the same species undergo evolution into other species in the process of interconversion. The isolation of initial microbe forms from filtrates of cultures causing typhoid, brucellosis, tuberculosis, anthrax, tetanus, dysentery, paratyphoid, diphtheria, and other diseases proves that microbes are capable of transformation into a filterable form (virus) and that the division into viruses and microbes is entirely artificial.

The fact that live microbes and viruses can be isolated from various substrates, including those which hitherto have been considered sterile -- namely, tuberculin, mallein, brucellohydrolysate, and the antibiotics penicillin, aureomycin, and streptomycin -- proves that the borders of life lie far beyond the limits assumed by science since Pasteur. The isolation of live microbes and live viruses from killed vaccines, which has been carried out by G. M. Bosh'yan, M. S. Shaburov, and M. N. Popov'yants, and also the isolation of live microbes from hyperimmune sera (which hitherto were assumed to contain only antibodies), throw an entirely new light on the so-called sterile state of passive or active postinfection or postvaccination immunity. It is wrong to assume that viruses, as distinguished from microbes, are incapable of propagation outside of living cells and that they may live only as intracellular parasites in the organism of host plants and animals. They do develop and propagate in artificial media as long as nucleoproteids are present. Viruses occur in the soil, air, and water.

The metabolism, division, and propagation of viruses proceeds by way of crystallization. The virus nucleoproteid is the basic protein from which all forms and species of microorganisms are formed. Microorganisms in the state of formation from filterable viruses and filterable forms of microbes are exceptionally labile, easily dissociable, and transmutable into a variety of forms.

While these conclusions were reached on the basis of the work on infectious horse anemia, visible crystalline and microbe forms of many other disease-producing viruses were also obtained by the author and his collaborators. The transmutation of a filterable virus into the microbe form is not particularly easy, because the virus is firmly associated with the proteins of the disease carrier, i.e., host. When this association has been disturbed, the virus is first transformed into microscopically visible grains and then into microbes. Many stages are involved in the transmutation, and the complete transmutation takes a long time. The end stage is a microbe which grows and propagates normally in the usual nutritive media. All stages of the transmutation have been definitely established with the aid of special techniques developed by the author. The reverse transformation of the microbe into a virus was accomplished by introducing the microbes into the body of an animal.

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The microbe cultures obtained in this manner can be preserved for years in a dried state and do not lose their capacity to grow on treatment with weak salt, acid, or alkali solutions. Boiling for hours does not affect them.

Some of the stages forming steps of the transmutation are lethal, while others are not particularly pathogenic or harmless. A small quantity of the microorganism in the right stage cures an animal infected with the disease in question or produces immunity in a healthy animal.

Until recently, it has not been possible to grow filterable viruses in artificial nutritive media. At present, the following viruses have been transformed into visible microbe forms [which can be grown in artificial media]: equine infectious anemia, swine plague, bird plague, inflammation of the tongue (Aphtae epizooticae, Stomatitis epizootica), hydrophobia, equine encephalomyelitis, typhus, human autumn encephalitis, and hog influenza. The pathogenicity and identity of microbes obtained from viruses causing equine infectious anemia, swine plague, and chicken plague could be confirmed by animal experiments. Conversely, 40 species of microbes were converted into (a) a crystalline form and (b) a filterable microbe form. In the course of the investigation of filterable forms of microbes, it was established that bacteriophagy involves the splitting up of bacterial cells into small particles which exhibit a very low rate of metabolism. The microorganism does not disappear, but is converted into another form. The conversion of certain forms of microorganisms into viruses and other forms of microorganisms endows them with an increase resistance to deleterious external influences. Viruses, filterable forms of microbes, and crystalline forms of viruses and microbes are more resistant than the vegetative forms of the latter.

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